

SECRET

Approved For Release 2005/04/18 : CIA-RDP64-00046R000200110002-5

27 MAR 1961

MEMORANDUM FOR: Director of Central Intelligence
THROUGH : Deputy Director (Intelligence)
SUBJECT : The OCR Minicard Project

1. Paragraph 9 contains a recommendation submitted for Director of Central Intelligence approval.
2. Office of Central Reference (OCR), by December 1958, had invested about \$400,000 in "Minicard", an information storage and retrieval system being developed by Eastman Kodak Company. From about February 1959 to April 1960, OCR ran a test of the equipment and the system, measuring it against the "Intellox" System, and then rejected Minicard because of "limitations on staff, on space, on money, and the limitations of the equipment itself to do a superior job."
3. Not one of these reasons is supported by factual evidence in the OCR reports on this test. These loosely written reports actually admit that the equipment was qualitatively superior to the Intellox, and that it would take only one-fifth as much space. The estimates of cost in personnel and money are based on faulty assumptions, incomplete data, and illogical conclusions. These reports contain many contradictions, unsupported generalizations, and misleading implications. They are silent

Approved For Release 2005/04/18 : CIA-RDP64-00046R000200110002-5

SECRET

SECRET

Approved For Release 2005/04/18 : CIA-RDP64-00046R000200110002-5

about a number of substantial questions the test was supposed to provide answers to. They did not provide the AD/CR or the DD/I with the data needed for a management decision of such a magnitude.

4. The test was begun with the OCR "consensus" admittedly against Minicard. The leadership was part time, unenthusiastic, and either unwilling or unable to conduct a real evaluation of the Minicard System. Outside help was rejected. Assistance from Eastern Kodak systems engineers was declined and discouraged. Air Force experience with Minicard was ignored. And after 1958 there was no collaboration with the Management Staff, although this is required by OCR's own statement of functions (R 1-130).

5. The views of OSI and CBR were not ascertained, and these offices had no part in the ultimate decision, although they are the largest potential "customers" of any retrieval system and although they are dissatisfied with the service from Intellofax. DD/P offices, which in recent months have been requesting three times as many Intellofax searches as CBR, had no voice. Likewise, within OCR itself no part in the decision was played by the Librarian, the Chief of the Documents Division, or the Chiefs of the four OCR Registers, and no test was made to learn if Minicard could be used by these Registers.

6. Other USIB members had no role in the test or voice in the evaluation, although about 32% of all Intellofax runs are

Approved For Release 2005/04/18 : CIA-RDP64-00046R000200110002-5

SECRET

made for them. Agency acceptance or rejection of Minicard had an obvious bearing on the ultimate goal of compatible systems within the intelligence community. The reports treat this consideration lightly, and the momentum of Agency leadership in this field appears to have been lost. While OCR was rejecting Minicard as "obsolescent", the Air Force was contracting for two more Minicard installations. The intelligence community (like Eastman Kodak) received the test results in the form of a summary narrative (COMB-D-23/1). No complete report with supporting data was ever issued.

7. The test reports indicate confusion within OCR as to what the actual requirement is for retrieval of documents. Intellofax is only a small part of OCR services, and its utilization constantly dwindles. But OCR continues to spend large sums for the development of refinements to the system.

8. It is unfortunate that the responsibility for the important and costly Minicard test rested within a single component, not subject to any check or control. A more meaningful test and a more objective evaluation would have been obtained by utilizing management and data-handling specialists as well as cost analysts from outside OCR in order to achieve a comprehensive Agency evaluation. The experience with Minicard clearly shows that CIA needs to centralize the control of its manifold data processing developmental activities. The logical place for

this is in a unit under the direction of the DD/S, on whom the over-all responsibility properly falls. The Agency now possesses sufficient competence to staff such a unit, which must be given real stature in view of the importance of its function.

9. It is recommended that the DD/S be directed to establish a unit under his immediate supervision, this unit being empowered to exert Agency-wide control over the research, development, and acquisition of automated data processing machines and computers. This control should extend over identification of requirements, external liaison and relationships, conduct of acceptance and operational tests, and the evaluation and reporting of such tests.

10. Detailed comments on the Minicard test and its findings are attached herewith. A recommendation for disciplinary action is being forwarded under separate cover.

Lyman B. Kirkpatrick
Inspector General

Attachment
(IS Report on OCR
Minicard Test)

xxxxxxDD/S
DD/I
DD/S
xxxxxx

The recommendation in paragraph 9 is approved. _____

Date

Director

Distribution:

Original - ~~xxxxxx~~ DD/I; no further distribution made.

xxxxxx
xxxxxxDD/I
Approved For Release 2005/04/18 : CIA-RDP64-00046R000200110002-5

1 - IG Subject File (Minicard)

1 - IG Chrono File
1 - RBShafter Chrono File
O/IG/RBShafter:mlr (21 March 1961)

ATTACHMENT

CONTENTS

Page

- 1 Why was Minicard originally considered?
What was the original intent of the test?
- 2 What did the Library Consultants say about Intellofax and Minicard (May 1957)?
What did Task Team No. 1 recommend (May 1958)?
- 3 What did Task Team No. 12 recommend (April 1958)?
What was the OCR attitude toward Minicard in January 1959?
- 5 What kind of test was to be run?
- 6 What kind of a test was run?
- 8 Why was the rejection of the Minicard System recommended by the Chief, Automation Development Group?
- 15 Why was the rejection of the Minicard System recommended by the Intellofax and Minicard Retrieval Composite Groups?
- 17 Why was the rejection of the Minicard System recommended by the Deputy AD/CR?
- 26 Why was the rejection of Minicard recommended by the AD/CR?
- 27 What did the CODIS Report (30 June 1960) say about the Minicard System?
- 30 What part did Eastman Kodak Company have in the Test?

ATTACHMENT

LIST OF REFERENCES

Reference

- A Memorandum for DD/I from AD/CR regarding Minicard test (13 April 1960).
- B Memorandum for AD/CR from DAD/CR regarding Minicard test (5 April 1960).
- C Memorandum for DAD/CR from Chairman, Retrieval Composite Groups regarding Minicard test (25 March 1960).
- D Memorandum for DAD/CR from Chief, Automation Development Group/CR regarding Minicard test (1 April 1960).
- E Report of test of Minicard System (COMIB-D-23/1) (30 June 1960).
- F Report of the Library Consultants (18 May 1957).
- G Report of Task Team No. 1 (9 May 1958).
- H Report of Task Team No. 12 (25 April 1958).
- I Memorandum for AD/CR from S/ASG regarding Computer Control Company proposal (7 November 1960).
- J Memorandum for AD/CR from DAD/CR regarding proposed Minicard test (22 December 1958).
- K Minicard Test Manual (January - August 1959).
- L Comments of Eastman Kodak personnel on Minicard test (20 April 1960).
- M OCR comments on Reference L (5 May 1960).
- N Letter from Eastman Kodak engineer to AD/CR (25 April 1960).

ATTACHMENT

THE MINICARD TEST

1. Why was Minicard originally considered?

According to the original project outline of April 1955, Minicard equipment was to be purchased and tested because it promised, in comparison with the Intellofax System:

- a. improved means for collation of intelligence data;
- b. greater speed and flexibility in the conduct of document searches; and
- c. economy in operation, particularly in the matter of space.

The outline also contemplated the possibility of Minicard being used for:

- a. an IAC program for comprehensive, one-time processing of incoming intelligence reports;
- b. a common IAC data storage and retrieval system.

2. What was the original intent of the test?

The project outline proposed a "large-scale test" of the equipment which would yield

- a. early elimination of features found defective;
- b. development of Minicard operating procedures;
- c. Guidance to Eastman in the further development of Minicard; and
- d. guidance to the Air Force and other members of IAC in the application of the ISC and the Minicard System.

It was planned to designate a task group to operate the full line of Minicard equipment parallel to but separate from the Intellofax program. It was expected that a joint program with the Air Force would be established during the test period.

3. What did the Library Consultants say about Intellofax and Minicard (May 1957)?

The consultants concluded that the Intellofax System was slow, costly, undependable, and failed to provide service at a sufficiently high intellectual level. They felt that Minicard might be used for part of the storage and retrieval job, but did not believe that Minicard would solve any of the urgent problems of speed and quality of service.

4. What did Task Team No. 1 recommend (May 1958)?

Task Team No. 1 studied the Intellofax System in detail in the light of the consultants' findings. The Task Team found that in some particulars the System was unreliable, inadequate, and slow.

The Team's lengthy report contained rebuttals of a number of the charges made against Intellofax, and, on the whole, its tone was highly favorable to the Intellofax System. The Team recommended that the Intellofax System should be retained, but with the incorporation of certain improvements relating principally to the revision of the Intelligence Subject Code, to refinements in the encoding of documents, and the processing of requests.

5. What did Task Team No. 12 recommend (April 1958)?

Task Team No. 12 studied the proposed Minicard project and recommended that a pilot Minicard operation be started as soon as possible. It further recommended that there be a determination to what extent Minicard could be used to advantage in connection with the OCR Registers. The tone of this report was enthusiastic and optimistic. The Team believed that Minicard had the potential to out-perform the Intellofax System and to alleviate the pressing space problems.

The Team visualized the steps for installing the Minicard System as

- a. a complete mechanical test of all the equipment;
- b. the establishment of a pilot Minicard operation and development of standard operating procedures; and
- c. the phasing-out of the Intellofax System.

6. What was the OCR attitude toward Minicard in December 1958?

A memorandum regarding the proposed Minicard test, written by the Deputy AD/CR in December 1958, represented a very different attitude toward Minicard than prevailed in the Task Team No. 12 report. This memo listed a large number of criticisms of Minicard:

- a. the original design objectives had been modified;
- b. extreme miniaturization which eliminated manual access might prove inferior to the aperture card system;

- c. the combination of codes and images on the same card "is now questioned by outside experts";
- d. this combination "is seen" to involve more expensive input and loss of the taped bibliography;
- e. Minicard code storage on film "is now recognized" as inferior in all respects to code handling on magnetic tape;
- f. additional pieces of equipment would be required with a delay in time of one to two years and a cost of three to five times the item costs of the original order;
- g. any test that would be conducted would seriously reduce Intellofax operating efficiency during the period;
- h. even with favorable results, the test would require an increase in investment from \$400,000 to \$700,000 or \$800,000;
- i. Minicard "would enter the test with the consensus of OCF criticism against it" on three major counts:
 - (1) even on paper (i.e., before being tested), Minicard document storage lacks the flexibility of the aperture card system;
 - (2) the Minicard sort and file techniques promise no significant improvements over IBM, and, in fact, are likely to prove inferior because manual access is eliminated;
 - (3) coding for Minicard will be substantially slower and more expensive than coding for Intellofax.

Having noted the many major reservations held by OCR and outside experts, the memo rather surprisingly concluded that OCR ought to make its own direct evaluation "before discarding the equipment", and recommended a "minimum test".

7. What kind of test was to be run?

In his memorandum of 22 December 1958, the DAD/CR proposed that 20 - 25,000 raw information reports be extracted over a one-month period and fully processed into both Intellofax and Minicard; that the input be accomplished in eight or nine months; and that, toward the end of the input period, retrieval tests be held, in order to compare the effectiveness of the systems. The test, as actually carried out, followed this procedure in a general way.

"The Minicard Pilot Project Test Manual" (January 1959, revised 17 August 1959) spelled out the objectives and stated that the test was intended to find out the quality of the System, as interpreted by customers and by OCR and as compared with the Intellofax System.

The test organ was to consist of a copy of each document distributed during a given period (January-February 1959). For retrieval, it was planned to submit 20 questions a day for two weeks (this was done in February 1960). An Evaluations Group (the DAD/CR, certain individuals participating in the test, and "perhaps individuals from other offices of the Agency") would take the findings and make a comparison of Intellofax and Minicard, both

for the actual test and on a projection over a five-year period, in five categories:

- a. personnel and training requirements;
- b. machine and supplies requirements;
- c. monetary costs (capital investment, operating costs, average costs of Intellofax and Minicard retrieval, other machine support of Minicard, such as punched card equipment, and continuation of Intellofax for seven years if Minicard is adopted);
- d. quality of document retrieval;
- e. capacity and speed for normal and crash requests.

8. What kind of a test was run?

Two documents discuss the Minicard test and its results. The first is a package of memoranda made up for the Project Review Committee (PRC) in April 1960. The second is a report made to the USIB Committee on Documentation (CODIB). It is dated 30 June 1960 and presents the Minicard test in the form of a case history. The PRC package consists of the following:

- a. a report from the Chief of the Automation Development Group of OOR (C/ADG) with attachments showing the estimated requirements for a full-scale Minicard System (1 April 1960);
- b. the report of the Intellofax and Minicard Retrieval Groups (25 March 1960);
- c. the report and recommendation of the DAD/CR (8 April 1960);

- d. the recommendation of the AD/CR (13 April 1960);
- e. memorandum from the DD/I (18 April 1960).

These papers do not give a clear picture of the test. They do not tell

- a. when the test was conducted;
- b. who was in charge;
- c. how the decision to drop Minicard was arrived at;
- d. essential test data.

There are a number of other matters which are not reported on:

- a. the possibility of Minicard aperture cards;
- b. the possibility of input without IBM equipment;
- c. the actual capacity of the Minicard installation and behavior under operational conditions;
- d. the problem of making a transition from the Intellofax System to Minicard;
- e. customer evaluations of Minicard;
- f. views of the Management Staff;
- g. the possible use of Minicard in the OCR Registers (BR, CR, IR, SR);
- h. compatibility with Air Force system and a possible USIB-wide common system;
- i. the possibility of a "source" file within the Minicard System;
- j. the disposition of documents which were not indexed (40%);

- k. Intellofax speeds, costs, space and personnel requirements (a comparison was supposedly being made).

Nevertheless, the C/ADG and the DAD/CR described the test as a "large-scale test", while the AD/CR called it "the most comprehensive test of its kind of which I have any knowledge." (Two months later he called it a "limited test", in an introduction to the COBIS report, and the text of that report referred to the test as a "minimum test.")

Task Team No. 12's report (and later documents) emphasized that the success of any data system depends on the proper application of an adequate code. In the comparative test of Intellofax and Minicard the same code was not used for both. The test reports do not give any serious appraisal of the effect this had on the test results. The COBIS report simply says that "the validity of comparisons between Minicard and Intellofax could have been affected." On the other hand, the Retrieval Groups' report says that the improved structure, form, and subject unity of the new Code (i.e., the Revised Intelligence Subject Code, used to test Minicard) was compensated for by the familiarity with the application and procedures of the old Code (i.e., the Intelligence Subject Code, used to test Intellofax). The COBIS report repeats this statement, but modifies it thus: "compensated for in part."

- 9. Why was the rejection of the Minicard System recommended by the Chief Automation Development Group (ADG/CR) (Reference D)?

The Chief of the Automation Development Group of OCR recommended that the Minicard equipment not be used for several reasons.

- a. His first reason was that the equipment did not perform in accordance with the specifications established at the outset of the project.

Comment: The equipment could hardly have been expected to perform up to specification inasmuch as it was a prototype, and research and development were still going on. The project outline stated that the system "is now mid-way in development." The modifications in the equipment appear to have been made to order to get a practical performance. The failure to perform according to specifications seems to refer mainly to operating speeds on certain machines which were substantially reduced from the original expectation. According to C/ADG's report, these speed reductions were significant because they would necessitate the purchase of additional equipment in order to operate "a full-scale system" in OCR. But no one had ever expected that the delivered equipment would be able to handle the full OCR load. The original project outline specifically called for additional machines to be purchased after the trial period, the number to depend on the amount of cooperation with the Air Force.

Comment: One of the machines whose operating speed was substantially reduced was the "selector". It was able to handle only 650 cards per minute, rather than the 1,200 originally specified. An attachment to the C/ADG's report estimates the amount of equipment required for a full-scale operation for processing 1,000 documents and 20 requests daily. In this attachment, it is estimated that a selector would be operating 3-6/10 hours per day (presumably it would be idle the rest of the working day). It is difficult to see how the reduction in speed would have made the purchase of an additional selector necessary, since the original machine would be idle more than half the time, even at the reduced speed.

The actual capacity of the equipment does not seem to have been tested. A letter from an Eastman Kodak engineer (25 April 1960) to AD/CR (Reference N) stated:

"The tests did not attempt, at any time, to seriously determine the 'capacity' of the equipment. It seems logical to make this test now to establish how much the equipment can do and at what price. Your report indicates that you have refused to use any of AF-1's data, and yet you have collected none of your own in this critical area."

The C/ADG, in his reply of 5 May 1960 to this charge, found the reference to a "capacity" test a little hard

Comment: to understand since a reasonable estimate of the equipment capacity could be obtained from such factors as cards per minute, feet of film per minute, etc., figures which were given in Eastman Kodak literature: "We have assumed that the speeds given to us were obtained on Air Force equipment under the supervision of Eastman Kodak personnel." But in another context in the same memorandum, C/ADG did not accept the Eastman Kodak figures, saying that OCR ran a camera one day for eight consecutive hours to determine its capacity, which turned out to be less than what Eastman claimed. This suggests that it might have been a good idea to test the capacity of the other machines, too. When the Air Force tested Minicard about 250 documents and ten searches a day were put into the system under operational conditions.

- b. C/ADG also stated that substantial amounts of standby equipment and maintenance service and supplies would be necessary.

Comment: In the case of the selector which would be used 3-5/10 hours a day, it was estimated that a second selector would also be necessary, the reason being that this machine is the backbone of the system, and if it would be out of service for two or three days the system would come to a complete standstill. The evidence for assuming that the machine could be out of service for two

Comment: or three days is not presented. The Air Force has not found standby machines necessary. With Eastman engineers and maintenance men readily available, and with these same machines in the Pentagon and in PIC, it would seem that an emergency situation could be handled without having a machine costing a quarter of a million dollars "standing by."

C/ADG estimated that for a full-scale operation five more enlarger-printers would be needed in addition to the one already on hand. Eastman Kodak engineers argued that this one was sufficient (Reference L). C/ADG explained (Reference M) that an additional printer was needed to print 4,600 pages of documents a day to replace Intellofax tapes. (No consideration or even mention was given to the possibility of using reading or viewing machines; none of these are included in the estimates.) Three and one-half printers would be needed to provide prints which are requested by document number and source, such requests not related to the Intellofax System (or to the Minicard), but comprising over 75% of the requests received for prints. These printers would probably have to print from aperture cards, since there is no manual access to the Minicards themselves and machine searches for single documents would not be very practical. The inclusion of these four machines (costing about \$250,000)

Comment: in the C/ADG's estimate of additional Minicard equipment needed is not in accord with his stated assumption that equipment in use (or planned) for reproduction of the present aperture cards would be modified to reproduce the Minicards mounted in aperture cards. The supply estimate projects a need for 2,860 IBM aperture cards per day. Whether Minicards could actually be mounted in IBM aperture cards and thereafter used in an Eastman Kodak printer or any other kind of printer does not seem to have been resolved during the test. The test reports say almost nothing about the aperture card problem, although it is obviously a key problem.

The daily supplies which would be needed have been carefully figured out to the penny (e.g., 3½ gallons of clearing agent - \$0.53). But pieces of equipment costing hundreds of thousands of dollars have been included in the estimates of projected cost with no justification spelled out. The possibility of using shifts as an alternative to leaving costly machines stand idle 16 hours a day and thereby cutting down on the number needed is not mentioned in the reports.

It should be noted that these estimates calling for 13 additional machines were disputed by the Minicard experts in Eastman Kodak, who on the basis of the limited data available to them concluded that no additional machines would be needed (Reference L). And assuming a

Comment: division of load between the Air Force and CIA, "we think that the present equipment at CIA is more than adequate to perform the job indicated." A disagreement of this magnitude should have been resolved by OCS management.

- c. C/ADG also concluded that Intellofax could not be modified to work in partnership with Minicard, and that the operating capabilities of Minicard would not substantially improve the Intellofax System.

Comment: No evidence or explanation is presented for these conclusions, which are presented as additional reasons for rejecting Minicard.

- d. C/ADG stated that "the down time on the equipment averaged 24.4% for the thirteen months of the test."

Comment: A number of people both in the government and elsewhere have been given this figure as evidence of the unreliability of Minicard equipment. It should be emphasized that this figure includes

- (1) idle time before the daily check
- (2) preventive maintenance and check-out time
- (3) training time for maintenance men.

These matters are not an index of machine reliability.

The Air Force did not include these factors, and had a down time of about 5%. Furthermore, the Recordak Company

Comment: had a crew of four maintenance men at the Pentagon to keep the machines operating, but OCR machines were serviced by two Recordak men who were training three Agency employees in maintenance. The excessive down time in OCR is a misleading figure.

10. Why was the rejection of the Minicard System recommended by the Intellofax and Minicard Retrieval Composite Groups (Reference C)?
These groups investigated the retrieval capabilities of the Minicard System by the use of a set of test questions given to both systems. They recommended that Minicard System not be used, owing to its "demonstrated inadequacies."

Comment: A careful reading of this report failed to find any inadequacies specified. Their report says that Minicard has the following advantages: phrase coding, unlimited boundaries and logical relationships, clear text, and a print as and product (this last is not specifically listed as an advantage). The report also states that the test showed a qualitative advantage for Minicard.

The test results were reported in detail. One hundred and eighty-five questions were processed in both the Minicard and Intellofax Systems. Out of the total number of relevant documents identified:

Minicard retrieved	79% of them
Intellofax retrieved	69% of them.

Comment: Out of the total retrieved by each system:

58% retrieved by Minicard were judged to be relevant

35% retrieved by Intellofax were judged to be relevant.

Intellofax produced over twice as many irrelevant references as Minicard did (1,229 vs. 576).

When Eastman Kodak pointed out (Reference N) that the test proved that Minicard gives superior service from a quality point of view, the reply of the C/ADG (Reference M) was that "what weight to give this is a policy decision", which would be affected by the:

- a. cost of obtaining this improvement;
- b. prospects for up-grading Intellofax and
at what cost;
- c. importance attached to the substantive
gain to the customer.

A few weeks later, the CODIB report stated: "We assign. . . priority to quality of input and relevance in retrieval", but this did not actually represent any change in the OCR opinion of Minicard.

The Composite Groups concluded that the superiority of Minicard was attributable to the coding and procedural techniques used, and that most of these could be incorporated into a revised Intellofax System. But the cost of doing this was not estimated. The CODIB report later stated that the advantages of Minicard could be incorporated into Intellofax "with additional cost in manpower or money", but gave no details.

11. Why was the rejection of the Minicard System recommended by the Deputy AD/CR (Reference B)?

The DAD/CR gave a number of reasons for rejecting Minicard:

- a. The retrieval test results clearly showed that any qualitative advantage of Minicard over Intellofax could be introduced into the Intellofax System with only minor revision of current routines and at minimal cost.

Comment: No estimate is given for the "minimal" cost.

- b. A substantial standby would be required with Minicard.

Comment: This repeats C/ADG without elucidation.

- c. It would be necessary to operate Minicard and Intellofax in parallel for not less than seven years since Intellofax System could not be converted feasibly to Minicard.

Comment: This was disputed by Eastman Kodak engineers.

Reference N made a proposal as to how conversion could be made, and suggested that 4,000,000 active cards could be converted in 50 working days. The feasibility of this was disputed by the C/ADG (Reference M) on technical grounds, and there the matter rests. The DAD/CR stated that "it is not economically or practically feasible to convert Intellofax to Minicard", but did not cite any evidence. In any case, the two systems would not be operated "in parallel", since

Comment: there would be no need for input into Dintellofax if Minicard were installed.

- d. The technology of storage and retrieval of information has advanced so rapidly that "we believe" Minicard, even in its latest model, to be obsolescent.

Comment: No evidence was submitted to demonstrate this. The AD/CR repeated this charge in his memorandum. This objection to Minicard was omitted from the CODIB report, however.

- e. "The economics [I.e., the cost] of the Minicard System are prohibitive."

Comment: DAD/CR stated that the additional Minicard equipment which would be necessary to deal with 1,000 documents a day and 20 requests a day would cost almost one and a half million dollars. This statement is questionable for a number of reasons:

- (1) This amount was quoted by Eastman Kodak within a few days of a telephoned request from DAD/CR on 1 April 1960. It represents the cost of 13 additional Minicard machines. It does not indicate firm prices, but "budgetary quotations".
- (2) As shown above, OCR did not demonstrate convincingly that additional machines would be needed. If the

Comment:

additional selector-sorter, duplicator, and enlargers were not bought, the total cost would be reduced by \$1,210,000.

- (3) The prices quoted were for the latest, fastest, and most expensive versions of the machines. These were not the machines which were tested. According to the CODIB report: "Second generation Minicard equipment promises much improved capability in speeds and other economies. . . . Our test did not go into the relative merits of these improved capabilities." The computer-duplicator, for example, was quoted at \$610,000 and delivery estimated at 18 months. But the need for a computer-duplicator rather than a duplicator is not touched on in any reports. The only justification presented for the purchase of a second duplicator is given in the C/ADG's estimates of equipment needed for a full-scale system, where it is estimated that 9.4 hours a day would be required for duplication in a one-card system, or 15.4 hours a day in a two-card system. Shifts were not taken into consideration as a possibility. In arriving at this estimate, C/ADG stated that he assumed that "any new Minicard

Comment:

equipment procured by the Agency would have the same operating capabilities as the equipment on hand." In other words, he estimated the number of slow (first generation) machines that would be needed, and DAD/CR then cited the cost of the faster (second and third generation) machines. In rejecting Minicard because the machines were too slow and too expensive, different sets of machines were being referred to, but this was not made clear.

- (4) The estimate of additional machines needed was based on a forecast of 1,000 documents and 20 searches processed daily. The Library Consultants in May 1957 found that about ten Intellofax searches a day were being made. In FY 1959, the number was eight; in FY 1960, it dropped to seven. (Figures based on the yearly total divided by 260.) The achievement of a capability of handling 20 searches a day is hardly of immediate urgency. Acquisition of a complete set of additional machines would mean that some would stand idle until search volume had been built up. The reports make no estimate as to when 20 searches a day are expected to be taking place.
- (5) Task Team No. 12 assumed that the cost of Minicard machines would be pro rated over a ten-year period.

Comment:

This approach has been used on other OCR estimates (see Reference I), and, if the \$1,500,000 had been pro rated over ten years, it would appear less formidable.

- (6) A strict analysis of the cost of adopting Minicard would have taken into account whatever money would have been saved thereby. The reports make no estimate of the cost of retaining and improving Intellofax, but it could be considerable. For example, \$125,000 is currently being spent to develop an electrostatic printer to include in the system.
- (7) A true cost analysis would have included not only the Intellofax costs for comparison (as called for in the original plans), but would have estimated the cost of running the two systems "in parallel." In DAD/CR's report, he stated he would discuss "the economics of the Minicard system. . .in comparison with Intellofax." Nevertheless, he did not do this.

Nowhere is the cost of Intellofax discussed.

A later document, written on another subject (Reference I), does give an estimate of the annual costs of Intellofax, based on the requirement of 1,000 documents a day and 20 requests. The cost of the IBM machines and the card list equipment is estimated at \$37,000 a year. Costs for machine and clerical

Comment:

personnel for Intellofax for one year are estimated at \$137,000. Annual supply requirements would come to \$20,000 a year, including 22 file cabinets a year at a cost of \$3,800. The saving of some of these expenditures obviously has a bearing on the "economics" of Minicard.

- (2) The elimination of IBM cards and machines was not considered, evidently, during the test or in estimating the cost. The use of IBM machines for input into the Minicard System was not originally contemplated, and Eastman Kodak does not feel that they are necessary or a part of their System. The Air Force Minicard installation does not consider them necessary. The PIC Minicard installation, however, does use IBM input. The C/ADG's estimate for a full-scale Minicard operation calls for 24 IBM machines plus 23 Minicard machines. In other words, the Minicard equipment would be only half of the entire operation.

Of the 24 IBM machines, eight are key punches, and eight are key verifiers. But in another connection (Reference I), C/ADG estimated that Intellofax needs only three key punches and two verifiers. In other words, five of these machines are needed for

Comment:

the Intellofax System, but to feed the same material into the Minicard System via IBM would require 16 machines. This seems odd, even considering the greater complexities which apparently enter in.

In the Eastman Kodak critique of the estimates, Company engineers proposed the use of flexowriters instead of IBM machines and estimated that five flexowriters could replace all of the IBM machines, with considerable savings. Although it seems that the use of IBM cards (an estimated seven and a quarter million a year) does have some advantages, these were not spelled out and these advantages were not weighed in terms of the cost of the IBM machines and the personnel to operate them.

- f. BAD/CR also stated that "personnel required to operate the Minicard System would number 47 more people than we presently use to operate the Intellofax System, not including the extra analytical personnel."

Comment: This statement is not supported by any evidence and is quite misleading. The number 47 is presumably derived from the C/ADG's estimate that 24 persons would be required to operate 24 IBM machines and 23 persons would be required to operate 23 Minicard machines in a two-card Minicard System. (This number does not include the three people needed to operate three card-to-tape converters.) No figures are given in the reports for the number of people needed to operate Intellofax, either "presently" or for a projected load of 1,000 documents and 20 searches daily, which was the base used for Minicard. Task Team No. 12 estimated that it took 64 persons to

Comment:

operate Intellofax at the 1957 level. Reference I estimated 28.4 man units would be needed at the 1,000-document level, but it is not clear that the same steps were included. There is no reason to suppose that Minicard would require 47 more people than either one of these estimates of Intellofax personnel. What the DAD/CR's statement seems to mean is that it would take 47 more people to operate a full-scale Minicard System at the 1,000-document/20-search level alongside a complete Intellofax System at the current level. Surely, no one contemplated running two complete systems. But a statement in the COBIE report adds that only about 27 additional people would be needed if a conversion from Intellofax to Minicard were accomplished. No evidence is given for this assertion.

Eastman Kodak engineers, figuring on the elimination of the IFM machines, claimed that 15 people would be sufficient to handle the entire Minicard machine operation (Reference L).

5. In reference to the problem of space, which in the original project outline was represented as critical, DAD/CR said:
The original space requirement was of the order of 100 square feet per Minicard installation. Our findings indicate 3,037 square feet would be required for an installation of the size necessary to handle our loads.

Comment: It is not understood where the idea of 100 square feet per Minicard installation came from, but it is obviously absurd. The 1955 project outline proposed to purchase 19 machines of various sizes plus miscellaneous equipment, such as file cabinets. These could hardly have been expected to go into a ten by ten space. The estimate of 3,037 square feet covers the 23 actual Minicard machines estimated necessary, and the working space around them. It does not include the card-to-tape converters, the 24 IBM machines, aperture card equipment, or the files. The Intellofax System was estimated at 4,800 square feet in the AD/CR's report. What this includes was not specified. Reference I estimated 1,000 square feet for the IBM machines used with Intellofax, and 2,200 square feet for file cabinets. It estimated the growth of the Intellofax files at 125 square feet a year (if 750,000 cards are retired yearly) for the next 15 years, and stated that the presently assigned space (November 1960) in the new building could accommodate these files.

Actually, there are now over nine million Intellofax IBM cards; 876,000 were added in FY 1960. The COBIE report acknowledged that space is a problem, and that Intellofax might require five times as much work and file space as Minicard. Nevertheless, the report indicated, space "is not, in our view, the paramount problem."

12. Why was the rejection of Minicard recommended by the AD/CR (Reference A)?

- a. He recommended against it because of "present limitations on staff, on space, on money, and the limitations of the equipment itself to do a superior job." (In attachment to Reference E, he modified "superior" to "substantially superior.")

Comment: The evidence presented for this has been discussed above. As far as the limitations on money are concerned, OCR has recently received funds for the development of machines, amounting to \$425,000 (\$125,000 for an automatic mounter; \$125,000 for a Bell and Howell electrostatic printer; \$175,000 for a Videograph printer). It is not known whether any of these machines will work. The mounter is not yet operational, long after delivery. An additional \$175,000 went to OCR for mechanical translation experiments in FY 1960 and \$445,000 more has been allocated for FY 1961. In other words, the receipt by OCR of over one million dollars for these current developmental projects casts some doubt on the "limitations on money."

- b. "Service from Minicard was considerably slower than service from Intellofax, varying from 50% to 100% slower. We believe that under operational conditions service speed would be about the same for the two systems."

Comment: Although the slowness of the Minicard machines was stressed in several reports, the above quotation is the only appraisal of the speed of the system, and no supporting evidence

Comment: is offered. The meaning is not clear. It may refer to input, or output, or both. How slow is something which is "100% slower"?

In the test, the Intellofax and product was the card list ~~contains~~ tape of bibliographic citations, whereas for Minicard a first page print was provided for each document retrieved. If one is to measure relative speed, it would seem that either both systems should have been measured for the time elapsed in producing copies of documents, or else both systems should have been measured for time elapsed in producing indexes to the information. Speed stated in percentages does not mean very much. Also, the actual speed of retrieval may be meaningless, if most of the recovered documents are irrelevant. Furthermore, the importance of speed has not been fully demonstrated. Questionnaires circulated by Task Team No. 1 to customers showed that slowness was the least frequently cited reason given for not using Intellofax.

One is surprised to learn that, during a test which ran for thirteen months, the Minicard performance "under operational conditions" was not measured, but left to conjecture.

13. What did the COMUS report (30 June 1960) say about the Minicard System?

In general, this report repeated the material found in the reports to the FRC. It dropped the statement that Minicard is obsolescent. It added several points which were not previously made, but presented no additional evidence or data.

- a. It emphasized that there has been a relative decline in the demand for literature searches, and that the Intellofax System represents only a small part of the total OCR service facility. The report estimated that in the over-all OCR picture Intellofax furnished only 2% of the total references provided and represented only 0.6% of the total requests received in FY 1959.

Comment: This suggests that OCR's investment of several hundred thousand dollars recently to develop improvements in the Intellofax System (Videograph, etc.) may not be justified. A recent OCR study of Intellofax searches made over a six-month period shows an average of about eight per day, distributed as follows:

OCI and ORR	2
IM/P	2
Other CIA	1
Army	1
HSA, Navy, Air	1
Other External	1

Task Team No. 12 had urged that the test determine to what extent Minicard could be used in the OCR Registers (IR, BR, SN, GR). This entire problem was disposed of in a single sentence: "Minicard equipment does not easily lend itself to fit in as a sub-system of OCR's

over-all machine system, much of which would have to be continued to process materials not suitable for control by Minicard." No actual study was made.

- b. The CODIB report also listed a number of technical disadvantages attributed to Minicard, such as: difficulty in providing linkage between given Minicard words within a phrase, limitation of natural language to six digits, impracticality of indicating pagination, difficulty in conversion of Minicard to reflect code changes, difficulty in "dictionary building", lack of manual access.

Comment: Minicard experts in Eastman Kodak state that these difficulties do not actually exist.

- c. "Retrieval quality (legibility) was not impressive."

Comment: The Air Force has also had trouble about this. The OCR reports confine themselves to this cryptic remark.

- d. The Minicard capability for greater depth of coding would be utilized only in four or five percent of the documents coded, which would suggest that the expense of Minicard could hardly be justified. Most documents do not need to be coded in depth.

Comment: This new consideration, taken in connection with the small number of requests for searches and the

large number of irrelevant retrievals, raises by implication some broad policy questions regarding OCR data storage which are not discussed in the CODIS report.

14. What part did Eastman Kodak Company have in the test?

AD/CR stated (Reference A): "We had support from. . .Eastman."

And the CODIS report said: "We have met with Eastman Kodak and shown them our reports and statistics. Our conclusions do not agree, but we have not been given sufficient cause to change our decision."

Comment: The Eastman Kodak Company (EK) has made no official complaint regarding the test, nor does it intend to do so. But it must be noted that OCR management has not handled its relationships with the EK engineers well:

- a. In the beginning, OCR declined the services of the EK systems engineers, which would have cost about \$25,000. Later, EK offers of such service free of charge were turned down. OCR thus deprived itself of advice and assistance from those persons most familiar with the system.
- b. At the time the test began, EK engineers were told that OCR had its own experts and did not need help from EK. Building passes held by two EK engineers were picked up

Comment: by OCR, allegedly on orders from the Office of Security. These individuals (former Agency employees) had WOC (without compensation) status and at the time were working closely with PIC, where one of them had even had a desk and safe. They were and are welcome at PIC, which never had a systems engineering contract. While not refused admittance to OCR, they were made to feel unwelcome. When the OCR experts needed help, they phoned the EK engineers at their homes at night, met semi-clandestinely or utilized EK maintenance engineers as couriers for questions and answers.

- c. The breakdown of communication between EK and OCR personnel was complete. Monthly meetings were instituted in March 1959. After a meeting in April 1959 and one in May 1959, no more were called by OCR, even though the test had almost a year to run and EK engineers made several requests that the meetings be resumed. In effect, there was no official contact between OCR and the EK Minicard engineers from May 1959 to April 1960.

Having allowed this situation to develop, OCR added insult at the end of the test by saying (Reference M) that if the EK Systems Development Department had been genuinely interested in the progress of the test, "it would have had representatives making periodic visits

Comment: to our operation site even though we did not have their services under contract."

- d. On or about 4 April 1960, EK learned from its representative in Omaha that AD/CR had informed SAC personnel that CIA was rejecting Minicard. When EK checked with AD/CR, it was confirmed that the decision had been made. Good business practice suggests that EK should have been the first to be told, and not left to hear it in such an indirect way. Good management suggests that no announcement should have been made before all the test results were written up or before the DD/I ratified the decision on 18 April.
- e. On or about 20 April 1960, three EK Minicard engineers met with AD/CR. They were shown the test findings as reported to the PRC, but not allowed to retain them. Since DAD/CR had left for Europe on 13 April, and C/ADG was not available, there was no chance to discuss the findings with those most responsible for the test. On the spot, the EK representatives drafted their comments (Reference L). These were answered on 5 May by Reference M, but an ensuing conference failed to resolve differences of interpretation or to reach a common understanding.
- f. At the April meeting, the EK representatives asked for a notification in writing that OOR had rejected the

Comment: Minicard System, and also asked for a copy of the report of the test. The only report ever received was a copy of the CODIB report, and the only notification ever received was the memorandum transmitting the report (19 July 1960). EK had received copies of monthly progress reports; they would seem to be entitled to some final report of findings after such an elaborate test of their product.

8. There are grounds for wondering just when the decision was made to reject Minicard:

Before the retrieval test was run, DAD/CR told SAC officials that the Minicard equipment was unreliable and subject to excessive "down time", and told other people outside the Agency that the decision had been made to reject Minicard (this was eventually reported to EK!).

Many months before Minicard was officially rejected, the Computer Control Company was asked by OCR to develop an information storage and selection system to be used in connection with Intellofax. And OCR initiated a project for Bell and Howell equipment to augment the Intellofax System before Minicard was officially rejected.